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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WOLLSCHLAGER, JEFFREY MICHAEL

ART UNIT	PAPER NUMBER
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1732

DATE MAILED: 05/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/764,149

Applicant(s)

FOREST ET AL.

Examiner

Jeff Wollschlager

Art Unit

1732

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,5,6,8,9,11-13,15 and 16 is/are pending in the application.
- 4a) Of the above claim(s) 1,3,5,6, and 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9,11-13,15 and 16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 4/23/04; 8/16/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

Applicant's election with traverse of Group II, claims 9, 11-13, 15 in the reply filed on April 28, 2006 with a species election of resin transfer molding is acknowledged. The traversal is on the ground(s) that it would not be unduly burdensome to examine both the apparatus and method claims. This is not found persuasive because these inventions have acquired a separate status in the art in view of their different classification. It is further noted that intended use limitations in an apparatus hold less patentable weight than intended use limitations in a method. As such, restriction for examination purposes as indicated is proper. The requirement is still deemed proper and is therefore made FINAL.

Claims 1, 3, 5, 6, and 8 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention there being no allowable generic or linking claim.

Response to Amendment

The amendment to claim 9 and new claim 16, filed April 28, 2006, have been entered. Claims 9, 11-13, 15 and 16 are under examination.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9, 15, and 16 are rejected under 35 U.S.C. 102(b) as being anticipated by Snyder et al. (U.S. Patent 5,686,117; issued November 11, 1997).

Regarding claim 9, Snyder et al. teach a method of manufacturing a preform for brake friction components (col. 1, lines 10-17) comprising: placing carbon fibers comprising loose fibers in the absence of binders (col. 3, lines 52-55; col. 3, line 65 - col. 4, line 2) into a constraint fixture having a bottom plate (Figure 2, element (48)), and an internal area corresponding in shape to the shape of the desired preform (Figure 2, element (60)), with the internal area being defined by annular perforated plates including an ejector/separator plate and a top/separator plate, an inner wall, and an outer wall in a mold apparatus (Figure 2, elements (58), (62), (56), and (24)), compressing the carbon fibers to form a fibrous matrix (col. 6, lines 7-9), removing the constraint fixture from the mold apparatus (col. 6, lines 9-10; col. 6, lines 14-16; col. 5, lines 25-27 – hydraulic or pneumatic compression means of the constraint fixture is included as part of the mold apparatus), and subjecting the materials in the constraint fixture to densification by one or more of resin transfer molding, resin or pitch infiltration and carbon vapor deposition (col. 4, lines 24-28; col. 6, lines 14-16). It is noted that the separator plates taught by Snyder et al. that form the ejector and top plate are annular.

As such, these plates have one perforation in the center. It is further noted that Snyder et al. teach that it is preferable, not required, to remove the separator plates prior to densification. As such, the claim is anticipated by the reference.

As to claim 15, Snyder et al. teach the brake friction component is configured as an aircraft landing system brake (col. 1, lines 10-17).

As to claim 16, Snyder et al. teach locking means to maintain the top plate in place in the constraint fixture (Figure 2, elements (64), (50), (70), and (72)). Further, the method inherently includes a means for lifting the constraint fixture out of the mold apparatus since Snyder et al. teach transporting the constraint fixture through subsequent unit operations. It is noted that the specific limitations of the locking means and the lifting means do not hold significant patentable weight for the method of forming a brake preform since their structure does not substantially impact the practice or function of the method.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9,11-13,15, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hecht (U.S. Patent 5,654,059; issued August 5, 1997).

Regarding claim 9, Hecht teaches a method of manufacturing a preform for brake friction components (col. 7, lines 20-21) comprising: placing carbon fibers comprising loose fibers in the absence of binders (col. 4, lines 55-61; col. 5, lines 43-48) into a constraint fixture having a bottom plate (col. 14, lines 54-56), and an internal area corresponding in shape to the shape of the desired preform (col. 4, lines 55-62; col. 7, lines 21-24), with the internal area being defined by flat faces/plates (col. 7, line 23) that are perforated (col. 7, lines 28-34) and annular (col. 7, lines 21-24) including a perforated annular ejector/stripper plate (col. 15, lines 10-14) and a perforated annular top plate/closure (col. 7, lines 28-33) with an inner and outer wall (col. 14, lines 54-56), compressing/compacting the carbon fiber material with a needle press to form a fibrous matrix (col. 10, lines 57-60; col. 11, lines 10-13), and subjecting the material in the constraint fixture to further densification by one or more of carbon vapor deposition , resin transfer molding, or resin or pitch infiltration (col. 9, lines 63-col. 10, line 8; col. 12, lines 49-51; col. 15, lines 21-25; col. 15, lines 67-col. 16, line 5).

Hecht does not expressly state that the constraint fixture is removed from the mold apparatus/needle press prior to subjecting the material in the constraint fixture to further densification. This is only implied in the teaching of Hecht. However, it would have been *prima facie* obvious to one of ordinary skill to move the compressed material within the constraint fixture for further densification because one of ordinary skill would recognize the productivity and cost benefits associated with doing so. If the densification process were to occur within the needle press apparatus the needle press

would be idle for the entire length of the densification process. One of ordinary skill would be motivated to keep all equipment running to reduce manufacturing costs.

Furthermore, the densification steps require additional equipment and materials that are not well-suited for use with a needle press. For example, the presence of flammable resins/vapors would require the needle press to have additional and expensive equipment, appropriately classified, to prevent fires. One of ordinary skill would be motivated to avoid this cost and risk. Finally, one of ordinary skill would be motivated to remove the constraint fixture from the mold apparatus/needle press prior to subjecting the material in the constraint fixture to further densification in order to ensure the final dimensions and density of the part are achieved without the relaxation associated with removing the constraining pressure from the material (col. 15, lines 12-14, for example). As such, the claimed invention as a whole is rendered obvious over the teaching of Hecht.

As to claim 11, Hecht teaches the loose fibers are produced from chopped tow (col. 6, lines 21-22). The tow is sprayed/flows in a continuous stream into the constraint fixture (col. 6, lines 46-64; col. 7, lines 41-47).

As to claim 12, Hecht teaches placing a veil/scrim/perforated foam sheet into the mold cavity (col. 7, lines 30-33; col. 14, lines 4-5).

As to claim 13, Hecht teaches the method of claim 9 as discussed in the 103(a) rejection above and further teaches the binderless chopped fibers are pressed to a density suitable for densification. Hecht does not teach pressing at a pressure of about 3-10 atmospheres. However, Hecht does teach manufacturing preforms of different

densities (col. 13, lines 41-45) and different thicknesses (col. 9, lines 6-10). Both of these variables are directly impacted by the pressure used in the compressing/needle-pressing step. Therefore one of ordinary skill in the art would have to take all of these variables into consideration when determining the pressure at which to compact the fibers. As such, this is a recognized control variable for forming a brake preform and would have been readily optimized as is routinely practiced in the art. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

As to claim 15, Hecht teaches the brake friction component preform is configured as a brake for a disc brake for an aircraft (col. 1, lines 45-47).

As to claim 16, Hecht teaches the mold apparatus comprises a locking means (col. 15, lines 10-15) for maintaining the top plate in place in the constraint fixture. Further, the method of Hecht implicitly includes a means for lifting the constraint fixture out of the mold apparatus/needle press. It is noted that the specific limitations of the locking means and the lifting means do not hold significant patentable weight for the method of forming a brake preform since their structure does not substantially impact the practice of the method.

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Snyder et al. (U.S. Patent 5,686,117; issued November 11, 1997).

As to claim 13, Snyder et al. teach the method of claim 9 as discussed in the 102(b) rejection above. Snyder et al. do not teach pressing at a pressure of about 3-10 atmospheres. However, Snyder et al. do teach manufacturing preforms to a fixed density and thickness (col.4, lines 11-15) and that thicker or thinner preforms may be

made as desired (col. 5, lines 23-24). Both the density and thickness of the preform are directly impacted by the pressure used in the compacting step. Therefore one of ordinary skill in the art would have to take all of these variables into consideration when determining the pressure at which to compact the fibers. As such, this is a recognized control variable for forming a brake preform and would have been readily optimized as is routinely practiced in the art. (See *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980)).

Claims 9, 11, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over DeMunda (U.S. Patent 4,178,413; issued December 11, 1979).

Regarding claim 9, DeMunda teaches a method of manufacturing performs for brake friction components (col. 3, lines 8-10) comprising the steps: placing carbon fibers comprising loose fibers/filaments (col. 3, lines 41-52) in the absence of a binder (col. 3, lines 38-41) into a constraint fixture having multiple annular plates and an internal area corresponding in shape to the shape of a desired perform, said internal area being defined by annular plates, and an inner wall comprising a perforated feed pipe in a mold apparatus (col. 3, lines 41-53; col. 5, lines 5-15), compressing the carbon fiber materials to form a fibrous matrix (col. 3, lines 35-37), and subjecting the materials in the constraint fixture to densification by carbon/chemical vapor deposition (col. 3, lines 16-25) and any suitable impregnation technique such as resin transfer molding and resin or pitch infiltration (col. 3, lines 26-32; col. 4, lines 20-24).

Demunda does not expressly state that the plates used in his method constitute a bottom plate, a perforated ejector plate, and a perforated top plate. Demunda also does not expressly teach that his assembly/constraint fixture consists of an outer wall and that the assembly/constraint fixture is removed from the mold apparatus when it is going to be subjected to further densification. However, Demunda does teach that loose filaments fibers are packed around a perforated feed pipe (col. 3, lines 48-51) and held in a compressed condition and that the assembly can be circular and is perforated with a centralized hole to facilitate flow of the densifying material (col. 3, lines 43-45). The multiple plates within the assembly function as ejector plates (col. 5, lines 5-20; Example 1)

Therefore it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the claimed invention to employ an assembly/constraint fixture with a bottom plate, top plate, and outer walls for the purpose of effectively holding the loose filament fibers in a compressed condition in order to keep the loose fibers/filaments from falling out of the assembly and for providing the required surfaces upon which the fiber can be compressed. These plates have a perforation in the center to provide an opening for the perforated feed pipe. It would have also been obvious to one of ordinary skill to create more perforations in the plates for the purpose of providing additional flow paths for the resin to flow from the center of the assembly in an outward and upward/downward direction to better impregnate the preform.

Further, although not expressly stated, Demunda implies removing his constraining fixture from the molding apparatus for further densification (col. 5, lines 26-

36, note the phrase "maintained under compression"). Additionally, it would have been *prima facie* obvious to remove the constraint fixture from the mold apparatus because one of ordinary skill would be motivated to layout the manufacturing operation in such a manner to promote safety and productivity. Performing subsequent unit operations/steps in subsequent locations while the matrix is "maintained under compression" would have been obvious to achieve this purpose. As such, the claimed invention as a whole is rendered obvious over the teaching of Demunda.

As to claim 11, the loose filaments are implicitly produced by chopping/cutting continuous fiber filaments/yarns/tape/tow (col. 3, lines 13-15; col. 3, lines 48-51) and spraying/packing the fibers into the constraint fixture (col. 3, lines 48-51).

As to claim 15, Demunda teaches the brake friction component is used for an aircraft (col. 3, lines 8-9).

Conclusion

All claims are rejected.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeff Wollschlager whose telephone number is 571-272-8937. The examiner can normally be reached on Monday - Thursday 7:00 - 4:45, alternating Fridays.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Colaianni can be reached on 571-272-1196. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JW

Jeff Wollschlager
Examiner
Art Unit 1732

May 9, 2006



MICHAEL P. COLAIANNI
SUPERVISORY PATENT EXAMINER